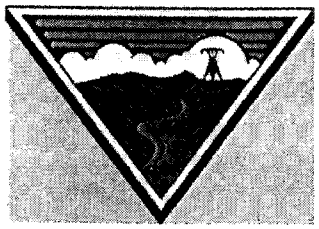
BONNEVILLE POWER ADMINISTRATION

Hedging Program Evaluation



Price Waterhouse LLP

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I. EXECUTIVE SUMMARY

In 1994/1995 Bonneville Power Administration (BPA) began a pilot program using financial instruments to hedge the price risk that results from movements in electricity prices. In July of 1997, Price Waterhouse (PW) conducted a strategic and analytical review and evaluation of this process which included interviews with key program participants and reviews of relevant documentation and management records. The work was performed as a management consulting study and was not intended to be in accordance with generally accepted financial audit or review standards. This report provides a summary of the findings discovered during that process relative to BPA's future risk management activities. In addition, PW has identified recommendations to assist BPA in improving the current policy and procedures in terms of operational procedures, organizational structures and documentation to maintain a risk management program which is capable of meeting BPA's expected levels of financial instrument use.

BPA's past and current activities were the subject of a separate report written concurrently with this report. This report primarily addresses BPA's future expected activities and the appropriateness of BPA's current policies and procedures to accommodate future plans. However, some aspects and recommendations are contained in both reports for the clarity and completeness of each report separately.

The following is a brief overview of each section in this report.

- Section II provides an overview of our objectives in conducting this evaluation and assessment. Listed are seven points defined by BPA for PW to consider during our investigation.
- Section III explains PW's approach to conducting reviews of this nature. PW has developed a framework to guide us in development and evaluation of risk management programs which is based upon our experience from assisting numerous clients like BPA and other utilities, both public and investor-owned, in the development and review of their risk management programs.
- Section IV contains our detailed review and analysis of BPA's risk management program which forms the body of this report:

II. PROJECT OVERVIEW

The objective of our review was to provide an assessment of BPA's past, current and future expected use of derivative securities to hedge commodity price exposure to confirm that this activity has been appropriately documented, reported and controlled in a manner consistent with industry practices and to assess the capabilities of BPA's current program to handle the increased levels of activity expected in the future. BPA's past and current activities were the subject of a separate report written concurrently with this report. This report primarily addresses BPA's future expected activities and the appropriateness of BPA's current policies and procedures to accommodate future plans. However, some aspects and recommendations are contained in both reports for the clarity and completeness of each report separately. Specifically, the overall objectives were to:

- Review the suitability of hedging strategies and derivative transactions for compliance with management objectives and approved policies.
- Assess the adequacy of the internal control process and infrastructure with respect to separation of duties, authority, approval, record keeping, and internal audit procedures.
- Evaluate the soundness of BPA's policies and procedures for governing the use of derivatives.
- Determine the adequacy of the valuation and risk management techniques employed by BPA.
- Review BPA's practices for managing market counterparty (including limit utilization and collateral considerations), liquidity and operational risk
- Evaluate the quality and frequency of monitoring and reporting to support effective risk management.
- Provide discussion, analysis, alternatives and recommendations related to BPA's current level of activity as well as BPA's anticipated future activity under its long term Energy Risk Management Program.

III. PW APPROACH

PW has assisted numerous clients in the development and review of their risk management programs. As a result, we have developed a comprehensive framework for managing risk. This framework, presented in Appendix I, serves as our guide during such engagements.

We have reviewed BPA's existing documentation and we have conducted interviews with risk management, trading, accounting, operations and planning personnel and management to obtain a detailed understanding of BPA's application of its written polices and procedures and the environment surrounding BPA's past, current and planned use of derivative instruments and physical contracts to manage the risks inherent in its electricity sales and marketing activities. In this report, we have compared what we have learned about BPA's risk management program to our comprehensive framework. Where appropriate, we have noted areas in which BPA's policies and procedures and practices are consistent with industry standards as well as areas in which improvements may be necessary to provide BPA with a comprehensive risk management program to accommodate BPA's future plans.

To accomplish these objectives, BPA has implemented an Interim Risk Management Policy, documented procedures governing the use and control of various financial instruments, purchased a third-party software and database system (PRIMO), and is continuing the process of developing economic/environmental models (RiskMod, Decision Tree, Point Forecast) to estimate BPA's revenue variation risk resulting from surplus energy sales and purchase activities. BPA has been authorized to transact using futures, options on futures, and over-the-counter options and swaps and has been actively engaged in the use of such instruments to hedge exposure to price risk from anticipated surplus power sales.

Table IV-1 summarizes the financial transactions performed during the life of the pilot program.

	SWAPS		FUTURES		OPTIONS			
					CALL		PUT	
	Receive Fixed	Receive Floating	Long	Short	Long	Short	Long	Short
1995	5	1	0	0	0	0	0	0
1996	20	8	0	523	0	0	0	0
1997	9	1	1	818	65	0	0	65
1998	1	0	0	160	0	0	0	0

Source: BPA Open and Closed Position Reports

Table IV-1
Transaction Volume Listed in the Year of Delivery

For the most part, BPA has used financial products to fix the sales price of forecast surplus energy. This strategy is equivalent to a physical trader selling forward. Both actions lock in a future price and reduce revenue volatility provided water volumes remain at a level where BPA can generate the power to deliver on the contract.

Swaps

In general, the swap contracts traded have a duration of 1 to 3 months with the exception of one recent transaction that has a duration of 15 months (from October 1997 to December 1998). Volume per contract is either 25 MW or 50 MW and BPA's predominant strategy has been to fix the delivery price of its forecast load. When managing price risk, receiving the fixed leg of a swap is economically equivalent to selling (short) futures.

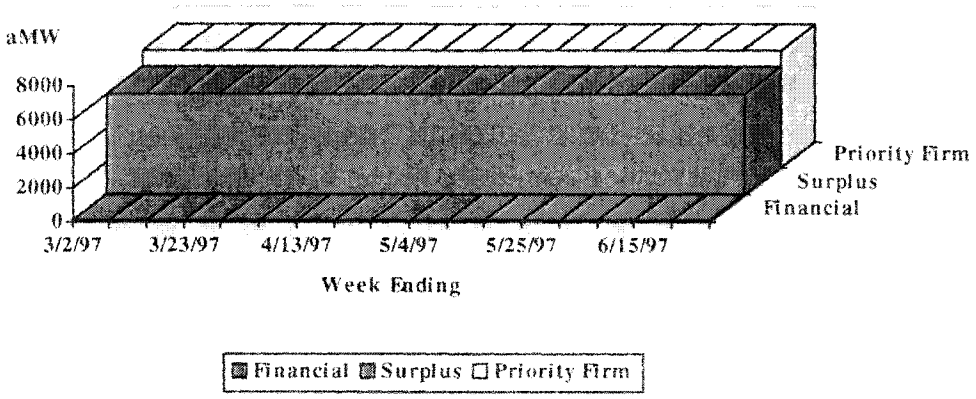
NYMEX Futures

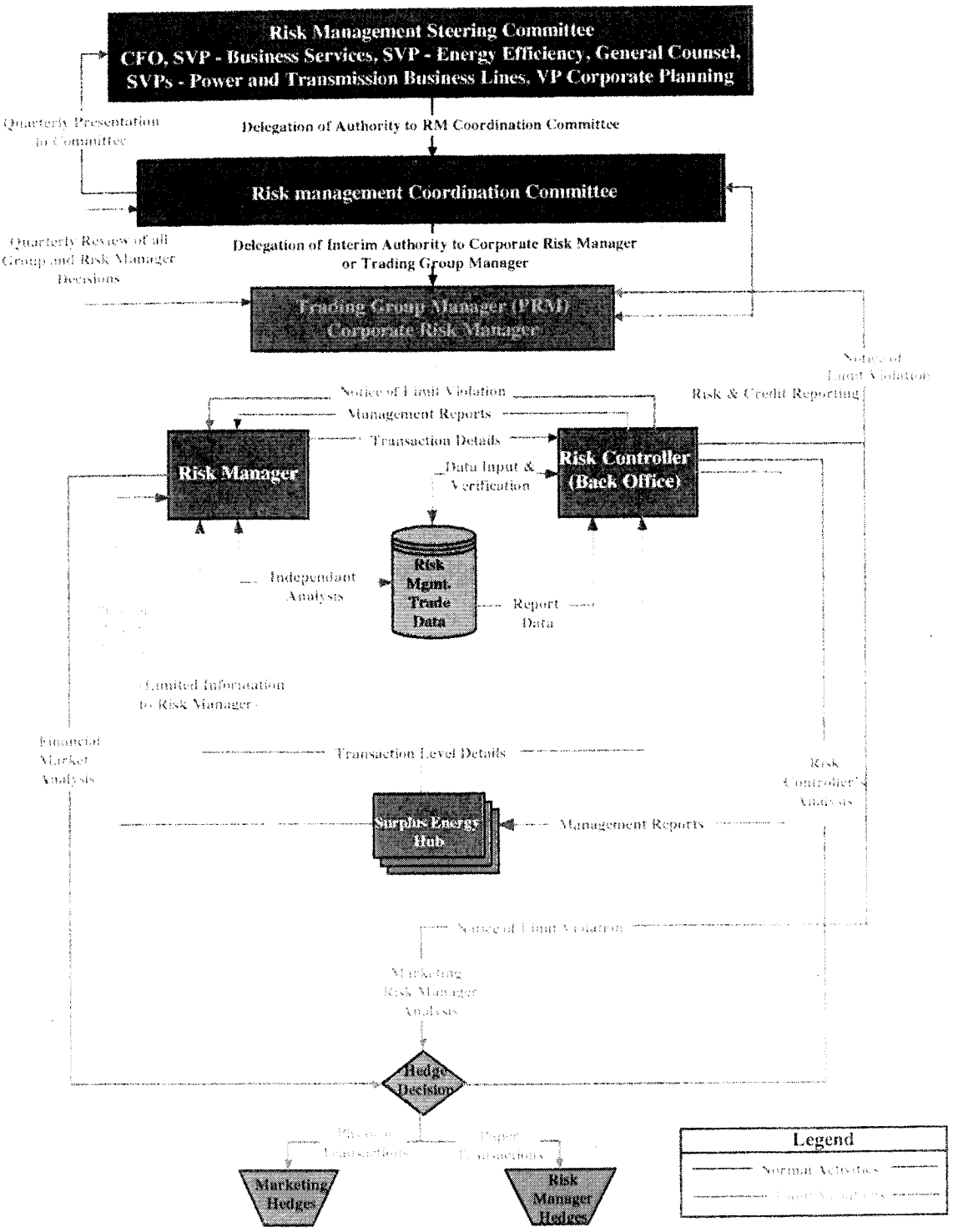
Futures volumes are higher in number than the OTC Swaps. One reason for this is the relative size of each contract is different. Swap contracts can be traded at any volume (usually 25MW or 50MW) and for any duration (usually 1 to 3 months, on-peak). On the other hand, futures are denominated in 2 MW on-peak blocks (736 MWh) and have a set duration of 1 month.

NYMEX Options on Futures

To date, BPA has used options in a strategy referred to as a "Fence" or "Collar". In general, this strategy replicates the pay-off of a futures contract with some profit or loss potential taken out around the expected trading price. This strategy was put in place in order to eliminate some forward prices that were fixed. Further discussions on the use of options and other hedging strategies are discussed in Section IV.C.2. of this report.

As stated above, this pilot program has had no significant impact on the risk profile of BPA. Illustration IV-1 provides some perspective on the level of financial transactions undertaken during the pilot program compared to the physical energy provided under the terms of BPA's long term contracts and any physical sales activity. At the moment, financial transactions represent less than 1% of BPA's load commitments.





Current Risk Management Organization Structure
Illustration B-1

APPENDIX IV - Financial Instrument Definitions

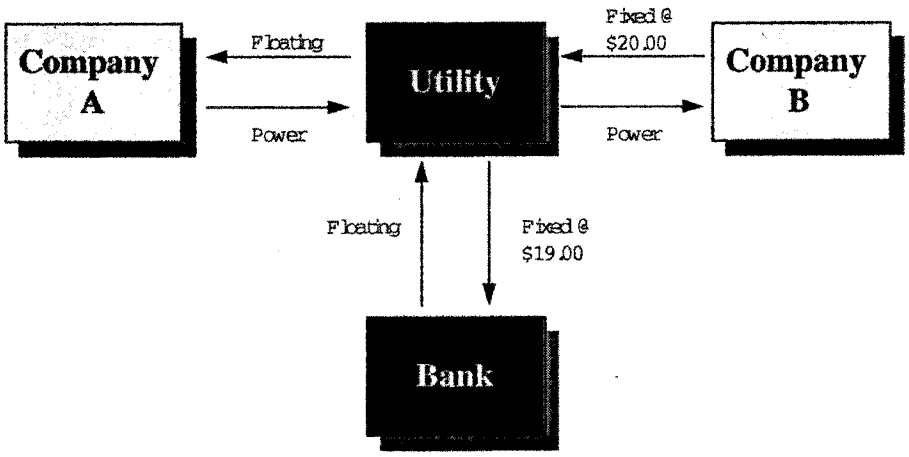
Outlined below are definitions for exchange traded and Over-the-Counter products.

Product	Forward Agreement
Market Environment	**Over-the-Counter**
Description	A forward agreement is a contract which fixes the price of a given commodity on a specified amount for a fixed period commencing at a specified date in the future. Positions in these contracts have the same principle risk characteristics as holding positions in the underlying commodity. In other words, a purchased forwards is akin to holding a long position in the underlying commodity. Purchasers of forward contracts benefit from rising prices, as do sellers.
Example	Forwards can be used either to take a position in the underlying or to hedge existing positions. ***Position Taking*** Based on a view of rising gold prices, a participant would enter into a long forward agreement for a specified number of ounces (e.g.; 100) at a contract price of $300/oz. If prices rise to $310, the holder of the contract would benefit from the price change for a total of $1,000. [100 ozs. * ($310 - $300)]. Likewise if prices fell to $290, the holder would loose $1,000. ***Risk Management*** An energy producer has agreed to sell 10 mw of peak power 16/6 throughout next month at a fixed price of $20 MWh. The producer however needs to purchase the power on the wholesale market. To protect the producer from rising prices between today and the day the power is delivered, the producer buys a one-month forward contract for 10mw to offset the exposure at a market price of $19.75. The producer is protected from changes in power prices with a $0.25 margin.

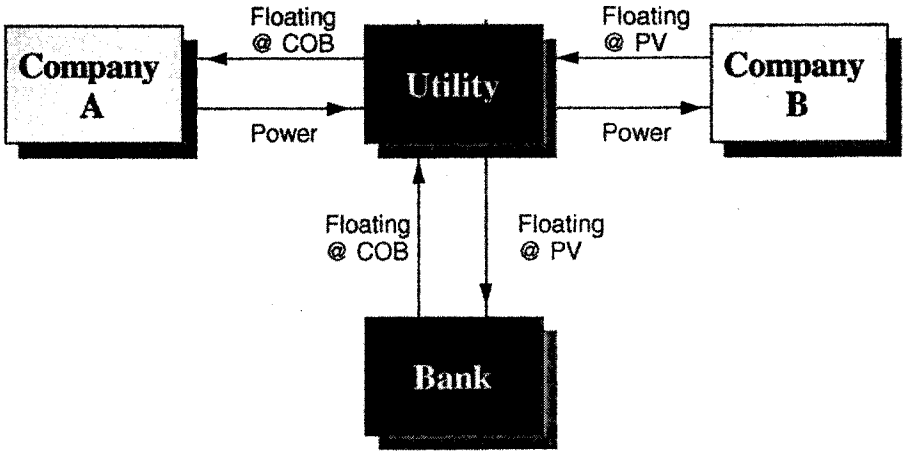
APPENDIX IV - Financial Instrument Definitions

Product	Futures Contract
Market Environment	**Exchange Traded**
Description	A futures contract is an agreement to buy or sell a standard quantity of a specific commodity at a predetermined price at some time in the future. As with forwards, positions in these contracts have the same principle risk characteristics as holding positions in the underlying commodity. In other words, a purchased future is akin to holding a long position in the underlying commodity. The primary distinctions between forwards and futures is that futures contracts are exchange traded, therefore their terms are standard while forward contracts are open to negotiation. Secondly, the credit risk is borne by the exchange whereas the credit risk on a forward is borne between the counterparties. Thirdly, gains and losses on futures contracts are settled daily through via a broker.
Example	As with forwards, futures can be used either to take a position in the underlying or to hedge existing positions. ***Position Taking*** Based on a view of rising oil prices, a participant could purchase 50 two-month futures (1,000 barrels/contract) at $18/barrel. If price were to rise to $20/barrel, the buyer of the futures contract would earn $2,000 [1,000 bls.* ($20-$18). ***Risk Management*** A gas company wants to protect 50,000 mmBtu from falling natural gas prices. The company would sell 5 futures contracts [50,000 mmBtu / 10,000 mmBtu per contract] at $2.00/mmbtu to hedge itself. If prices drop to $1.50, the value of its asset has fallen $25,000 but the company has made $25,000 on the futures contract.

APPENDIX IV - Financial Instrument Definitions

Product	Price Swap
Market Environment	**Over-the-Counter**
Description	A swap is an agreement between two parties to exchange sets of cash flows. The most common the swap structure is a fixed vs. floating price swap. In this case one counterparty agrees to pay the other a fixed payment stream while the other agrees to pay a stream based on an agreed upon price index.
Example	Swaps can be used for either hedging or trading. Trading swaps typically allow the user to take a view on the prices of a commodity by entering into a specific side of a swap. If the user has a view prices are going to rise, the use would either want to pay fixed or receive floating ***Risk Management*** A utility has purchased power at a floating monthly index from "Company A" (e.g.; paying floating)for 1 year and has sold power to "Company B" at a fixed price (e.g.; receiving fixed). To hedge this risk, the utility would enter into a swap where they would pay a fixed rate and receive a floating rate. The structure would look as follows:  In this example, the utility has protected itself from market price changes while locking in a profit of $1 MWh.

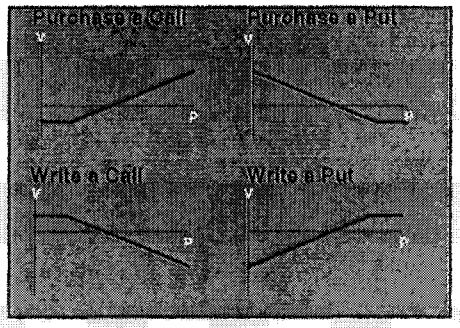
APPENDIX IV - Financial Instrument Definitions

Product	**Basis Swap**
Market Environment	**Over-the-Counter**
Description	A swap is an agreement between two parties to exchange sets of cash flows. The most common the swap structure is a fixed vs. floating price swap. In the case of a basis swap both sides of the swap are floating, however each side is tied to different indices.
Example	As with price swaps, basis swaps can be used for either hedging or trading. Trading swaps typically allows the user to take a view on the widening or narrowing of a basis relationship (e.g.; Spread). ***Risk Management*** A utility has sold power at a floating price at Mead and has purchased the power for delivery at COB. The utility is exposed to a changing price relationship between PV and COB. To hedge this risk, the utility would enter into a basis swap where they would pay PV prices and receive COB prices. The structure would look as follows:  In this example, the utility has protected itself from a change in the spread between COB and PV prices.

APPENDIX IV - Financial Instrument Definitions

Product	Option
Market Environment	**Over-the-Counter**
Description	An option is a contract between two parties in which the buyer has the right, but not the obligation, to buy or sell an underlying asset at a price (the strike price) specified in the contract for a specified amount of a particular commodity for a specified period of time. The buyer of a call option has the right to buy, while the buyer of a put option has the right to sell. Meanwhile, the seller of an option assumes a contingent liability based on whether the option is exercised or not. As such there are only four possible options combinations; buy a call, sell a call, buy a put, sell a put. The purchaser of an option pays a "premium" which represents the cost of the option and is calculated using mathematical models. Options may be characterized as either European or American. A European option may only be exercised on a specific date while an American option may be exercised at any time before maturity.
Example	(Cont. on Next Page)

APPENDIX IV - Financial Instrument Definitions

Product	**Option (Cont.)**
Example	Option can be used for either trading or risk management purposes. *Position Taking* An option can be used as a surrogate to other financial or physical instruments based on the chart below: **Buy a Call — Long** | **Buy a Put — Short** **Sell a Call — Short** | **Sell a Put — Long** *Risk Management* Options can be used to hedge positions while still maintaining upside potential. Since options follow four basic payoff patterns:  A utility which has exposure to falling prices could hedge its exposure buy purchasing a put option. As the prices fall, the value of the option increases to offset the loss in value of the underlying asset.